

Primitive equations with linearly growing initial data

AMRU HUSSEIN, MARTIN SAAL AND OKIHIRO SAWADA

Abstract. The primitive equations in a $3D$ infinite layer domain are considered with linearly growing initial data in the horizontal direction, which illustrates the global atmospheric rotating or straining flows. On the boundaries, Dirichlet, Neumann or mixed boundary conditions are imposed. The Ornstein-Uhlenbeck type operator appears in the linear parts, so the semigroup theory is established by Trotter's arguments due to decomposition of infinitesimal generators. To obtain smoothing properties of the semigroup, derivatives of the associated kernel are calculated. For proving time-local existence and uniqueness of mild solutions, the adapted Fujita-Kato scheme is used in certain Sobolev spaces.

Mathematics Subject Classification (2010): 35Q35 (primary); 76D03, 47D06, 35K65, 86A05 (secondary).